In the Claims:

1. (Original) An image processing device which by processing an image defined by a combination of unit graphic forms splits said unit graphic forms into multiple sub-unit graphic forms,

the image processing device comprising:

an interpolated line computation means for determining an interpolated line which is the line that interpolates a space between two vertices from an interpolation vector used for determining a line that interpolates a space between a given vertex and another vertex of vertices of said unit graphic forms and from coordinates of said vertices; and

an interpolated point computation means for determining as vertices of said sub-unit graphic forms, interpolated points which are points on said interpolated line.

2. (Original) The image processing device as described in claim 1 wherein:

if a unit graphic form has vertices 1 through 4, a line segment which joins vertices 1 and 2 of said vertices 1 through 4 and a line segment that joins vertices 3 and 4 of said vertices 1 through 4 lie opposite each other, and a line segment which joins said vertices 1 and 3 and a line segment that joins said vertices 2 and 4 lie opposite each other; said interpolated line computation means determines an interpolated line 1 which interpolates a space between said vertices 1 and 2, an interpolated line 2 which interpolates said vertices 3 and 4, an interpolated line 3 which interpolates a space between said vertices 1 and 3, and an interpolated line 4 which interpolates said vertices 2 and 4, and also determines an interpolated line 5 which interpolates a space between an interpolated point on said interpolated line 1 and an interpolated point on said interpolated line 2; and said interpolated point computation means determines interpolated points on said interpolated lines 1 through 5 as vertices of said sub-unit graphic forms.

3. (Original) The image processing device as described in claim 2, and further comprising:

an interpolation vector computation means for determining said interpolation vectors at interpolated points on said interpolated line 1 from said interpolation vectors at said vertices 1 and 2 and determining said interpolation vectors at interpolated points on said interpolated line 2 from said interpolation vectors at said vertices 3 and 4; wherein said interpolated line computation means determines said interpolated line 5 from said interpolation vectors at interpolated points on said interpolated lines 1 and 2 and from coordinates of the interpolated points.

4. (Original) The image processing device as described in claim 3, wherein

said interpolation vectors at vertices 1 through 4 of said unit graphic forms are normal direction normal vectors of a shape to be produced by said unit graphic forms.

5. (Original) The image processing device as described in claim 3, wherein

said interpolation vectors at vertices 1 through 4 of said unit graphic forms are vectors which define a direction at said vertices 1 through 4 of each said interpolated line which passes through said vertex 1 through 4, respectively.

6. (Original) The image processing device as described in claim 4, wherein

said interpolation vectors at vertices 1 through 4 of said unit graphic forms further include, in addition to said normal vectors, interpolated line direction vectors which define a direction at said vertices 1 through 4 of each said interpolated line which passes through said vertex 1 through 4, respectively.

7. (Original) The image processing device as described in claim 6, wherein

said interpolated line computation means determines said interpolated lines 1 through 4 using said interpolated line direction vectors, and said interpolation vector computation means determines said interpolation vectors at

interpolated points on said interpolated lines 1 and 2 using said normal vectors.

8. (cancelled)

9. (Original) The image processing device as described in claim 1, wherein

said interpolation vectors at vertices of said unit graphic forms are normal-direction normal vectors of a shape to be produced by said unit graphic forms.

10. (Original) The image processing device as described in claim 9, wherein

said interpolation vectors at the vertices of said unit graphic forms further include, in addition to said normal vectors, vectors which define a direction of said interpolated lines at said vertices.

11. (Original) The image processing device as described in claim 1, wherein said interpolation vectors at the vertices of said unit graphic forms are interpolated line direction vectors which define directions of said interpolated lines at said vertices.

12. (Canceled)

13. (Original) The image processing device as described in claim 11 wherein

said interpolated line direction vectors are vectors which define a tangent direction of said interpolated lines at said vertices.

14. (Original) The image processing device as described in claim 1 and further comprising:

an interpolation vector computation means for determining from interpolation vectors at said vertices, an interpolation vector to be used for determining the line which interpolates the space between a given interpolated point and another interpolated point of said interpolated points.

15. (Original) The image processing device as described in claim 14, wherein

when a ratio of values corresponding to a distance from said interpolated point between one vertex and another vertex to one of said one vertex and the other vertex, respectively, is denoted by t: 1-t,

said interpolation vector computation means determines as the interpolation vector at said interpolated point the result corresponding to the sum of (1-t) times the interpolation vector at said one vertex plus t times the interpolation vector at said other vertex.

16. (Original) The image processing device as described in claim 15, and further comprising:

a correction means for correcting the interpolation vector at said interpolated point determined by said interpolation vector computation means.

17. (Original) The image processing device as described in claim 16, wherein said correction means determines the vector product of the interpolation vector at said interpolated point

determined by said interpolation vector computation means and a tangent-direction tangent vector of said interpolated line at said interpolated point, determines the vector product of said vector product
and said tangent vector, and takes a resulting vector as a post-correction interpolation vector at said interpolated point.

18. (Original) The image processing device as described in claim 17, wherein said image is a three dimensional image, and the image processing device further comprises a rendering means for
rendering said sub-unit graphic forms.

19. (Original) The image processing device as described in claim 18, wherein said rendering means performs shading based on said post-correction interpolation vector.

20. (Original) The image processing device as described in claim 11, wherein said interpolated line is a Bezier curve.

21. (Canceled)

22. (Original) The image processing device as described in claim 1, wherein
if the coordinates of the vertices of said unit graphic forms and the interpolation vectors are recorded on a recording medium, the image processing device further comprises a playback means for playing back from the recording medium the coordinates of said vertices and the interpolation vectors.

23. (Original) The image processing device as described in claim 1, wherein

if the coordinates of the vertices of said unit graphic forms and the interpolation vectors are transmitted via a transmission route, the image processing device further comprises a reception means for receiving the coordinates of said vertices and the interpolation vectors transmitted via the transmission route.

24. (Original) The image processing device as described in claim 1, wherein

said image is a three-dimensional image, and the image processing device further comprising:

an operation means which is operated when a prescribed input is given;

a geometry processing means for reading data concerning said unit graphic forms from a recording medium and performing with respect to the data, geometry processing that corresponds to input from said operation means,

a conversion means for converting said sub-unit graphic forms obtained by splitting said unit graphic forms resulting after said geometry processing into ones in the coordinate system of a two-dimensional output device, and

a rendering means for rendering said sub-unit graphic forms converted by said conversion means.

25. (Original) An image processing method for an image processing device which by processing an image defined by a combination of unit graphic forms, splits said unit graphic forms into multiple sub-unit graphic forms,

the image processing method comprising:

an interpolated line computation step of determining an interpolated line which is a line that interpolates a space between two vertices from an interpolation vector used for determining a line that interpolates a space between a given vertex and another vertex of vertices of said unit graphic forms and from coordinates of said vertices; and

an interpolated point computation step of determining, as the vertices of said sub-unit graphic forms, interpolated points which are points on said interpolated line.

26. (Original) The image processing method as described in claim 25, wherein

if a unit graphic form has vertices 1 through 4, a line segment which joins vertices 1 and 2 of said vertices 1 through 4 and a line segment that joins vertices 3 and 4 of said vertices 1 through 4 lie opposite each other, and a line segment that joins said vertices 1 and 3 and a line segment that joins said vertices 2 and 4 lie opposite each other,

said interpolated line computation step determines an interpolated line 1 that interpolates a space between said vertices 1 and 2, an interpolated line 2 that interpolates said vertices 3 and 4, an interpolated line 3 that interpolates the space between said vertices 1 and 3, and an interpolated line 4 that interpolates said vertices 2 and 4, and also determines an interpolated line 5 that interpolates a space between an interpolated point on said interpolated line 1 and an interpolated point on said interpolated line 2, and

said interpolated point computation step determines the interpolated points on said interpolated lines 1 through 5 as vertices of said sub-unit graphic forms.

27. (Original) The image processing method as described in claim 26 and further comprising:

an interpolation vector computation step of determining said interpolation vector at interpolated points on said interpolated line 1 from said interpolation vector at said vertices 1 and

2 and determining said interpolation vector at interpolated points on said interpolated line 2 from said interpolation vector at said vertices 3 and 4, and wherein

said interpolated line computation step determines said interpolated line 5 from said interpolation vector at interpolated points on said interpolated lines 1 and 2 and from coordinates of the interpolated points.

28. (Original) The image processing method as described in claim 27, wherein:

said interpolation vectors at vertices 1 through 4 of said unit graphic forms are normal direction normal vectors of a shape to be produced by said unit graphic forms.

29. (Original) The image processing method as described in claim 27, wherein:

said interpolation vectors at vertices 1 through 4 of said unit graphic forms are vectors which define the direction at said vertices 1 through 4 of each said interpolated line which passes through said vertices 1 through 4, respectively.

30. (Original) The image processing method as described in claim 28, wherein:

said interpolation vectors at vertices 1 through 4 of said unit graphic forms further include, in addition to said normal vectors, interpolated line direction vectors which define a direction at said vertices 1 through 4 of each said interpolated line that passes through said vertices 1 through 4, respectively.

31. (Original) The image processing method as described in claim 30, wherein:

said interpolated line computation step determines said interpolated lines 1 through 4 using said interpolated line direction vectors, and

said interpolation vector computation step determines said interpolation vectors at interpolated points on said interpolated lines 1 and 2 using said normal vectors.

32. (Canceled)

33. (Original) The image processing method as described in claim 25, wherein:

said interpolation vectors at vertices of said unit graphic forms are normal-direction normal vectors of the shape to be realized by said unit graphic forms.

34. (Original) The image processing method as described in claim 33, wherein:

said interpolation vectors at the vertices of said unit graphic forms further include, in addition to said normal vectors, vectors which define directions of said interpolated lines at said vertices.

35. (Original) The image processing method as described in claim 25, wherein:

said interpolation vectors at the vertices of said unit graphic forms are interpolated line direction vectors which define directions of said interpolated lines at said vertices.

36. (Canceled)

37. (Original) The image processing method as described in claim 35, wherein

said interpolated line direction vectors are vectors that express the tangent direction of said interpolated lines at said vertices.

38. (Original) The image processing method as described in claim 25, and further comprising:

an interpolation vector computation step of determining, from interpolation vectors at said vertices, the interpolation vector to be used for determining a line that interpolates the space between a given interpolated point and another interpolated point in said interpolated points.

39. (Original) The image processing method as described in claim 38, wherein

when the ratio of values corresponding to a distance from said interpolated point between one vertex and another vertex to said one vertex or to the other vertex, respectively, is denoted by t: 1-t,

said interpolation vector computation step determines as the interpolation vector at said interpolated point a result corresponding to the sum of (1-t) times the interpolation vector at said one vertex plus t times the interpolation vector at said other vertex.

40. (Original) The image processing method as described in claim 39, and further comprising:

a correction step of correcting the interpolation vector at said interpolated point determined by said interpolation vector computation step.

41. (Original) The image processing method as described in claim 40, wherein

said correction step

determines a vector product of the interpolation vector at said interpolated point determined by said interpolation vector computation step and a tangent-direction tangent vector of said interpolated line at said interpolated point,

determines the vector product of said vector product and said tangent vector, and

takes the resulting vector as a post-correction interpolation vector at said interpolated

point.

42. (Original) The image processing method as described in claim 41, wherein said image is a three-dimensional image, and further comprising a rendering step of rendering said sub-unit graphic forms.

43. (Original) The image processing method as described in claim 42, wherein said rendering step performs shading based on said post-correction interpolation vector.

44. (Original) The image processing method as described in claim 25, wherein said interpolated line is a Bezier curve.

45. (Canceled)

46. (Original) The image processing method as described in claim 25, wherein if the coordinates of the vertices of said unit graphic forms and the interpolation vectors are recorded on a recording medium, the image processing method further comprises a playback step of playing back from the recording medium the coordinates of said vertices and the interpolation vectors.

47. (Original) The image processing method as described in claim 25, wherein if the coordinates of the vertices of said unit graphic forms and the interpolation vectors are transmitted via a transmission route, the image processing method further comprises a reception step of receiving the coordinates of said vertices and the interpolation vectors

transmitted via the transmission route.

48. (Original) The image processing method as described in claim 25, wherein

said image is a three-dimensional image, and

said image processing device includes an operation means which is operated when a prescribed input is given, and

the image processing method further comprising:

a geometry processing step of reading data concerning said unit graphic forms from a recording medium and performing with respect to the data, geometry processing that corresponds to input from said operation means,

a conversion step of converting said sub-unit graphic forms obtained by splitting said unit graphic forms resulting after said geometry processing into ones in the coordinate system of a two-dimensional output device, and

a rendering step of rendering said sub-unit graphic forms converted by said conversion step.

49. (Original) A program distribution medium for providing a computer program to cause a computer to do processing that, by processing an image defined by a combination of unit graphic forms, splits said unit graphic forms into multiple sub-unit graphic forms,

said computer program comprising:

an interpolated line computation step that determines the interpolated line that is the line that interpolates a space between two vertices from an interpolation vector used for determining the line that interpolates a space between a given vertex and another vertex of the vertices of said unit graphic forms and from coordinates of said vertices, and

an interpolated point computation step that determines, as the vertices of said sub-unit graphic forms, interpolated points that are points on said interpolated line.

50. (Original) The program distribution medium as described in claim 49, wherein

if a unit graphic form has vertices 1 through 4, a line segment which joins vertices 1 and 2 of said vertices 1 through 4 and a line segment that joins vertices 3 and 4 of said vertices 1 through 4 lie opposite each other, and a line segment that joins said vertices 1 and 3 and the line segment that joins said vertices 2 and 4 lie opposite each other,

said interpolated line computation step determines an interpolated line 1 that interpolates a space between said vertices 1 and 2, an interpolated line 2 that interpolates said vertices 3 and 4, an interpolated line 3 that interpolates a space between said vertices 1 and 3, and an interpolated line 4 that interpolates said vertices 2 and 4, and also determines an interpolated line that interpolates a space between an interpolated point on said interpolated line 1 and an interpolated point on said interpolated line 2, and

said interpolated point computation step determines the interpolated points on said interpolated lines 1 through 5 as vertices of said sub-unit graphic forms.

51. (Original) The program distribution medium as described in claim 50, wherein

said computer program further comprises an interpolation vector computation step that determines said interpolation vector at interpolated points on said interpolated line 1 from said interpolation vector at said vertices 1 and 2 and determines said interpolation vector at interpolated points on said interpolated line 2 from said interpolation vector at said vertices 3 and 4, and

said interpolated line computation step determines said interpolated line 5 from said

interpolation vector at interpolated points on said interpolated lines 1 and 2 and from the coordinates of the interpolated points.

52. (Original) The program distribution medium as described in claim 51, wherein

said interpolation vectors at vertices 1 through 4 of said unit graphic forms are normal-direction normal vectors of the shape to be realized by said unit graphic forms.

53. (Original) The program distribution medium as described in claim 51, wherein

said interpolation vectors at vertices 1 through 4 of said unit graphic forms are vectors which define the direction at said vertices 1 through 4 of each said interpolated line that passes through said vertices 1 through 4, respectively.

54. (Original) The program distribution medium as described in claim 52, wherein

said interpolation vectors at vertices 1 through 4 of said unit graphic forms further include, in addition to said normal vectors, interpolated line direction vectors which define a direction at said vertices 1 through 4 of each said interpolated line that passes through said vertices 1 through 4, respectively.

55. (Original) The program distribution medium as described in claim 54, wherein

said interpolated line computation step determines said interpolated lines 1 through 4 using said interpolated line direction vectors, and

said interpolation vector computation step determines said interpolation vectors at interpolated points on said interpolated lines 1 and 2 using said normal vectors.

56. (Canceled)

57. (Original) The program distribution medium as described in claim 49, wherein said interpolation vectors at vertices of said unit graphic forms are normal-direction normal vectors of the shape to be produced by said unit graphic forms.

58. (Original) The program distribution medium as described in claim 57, wherein said interpolation vectors at the vertices of said unit graphic forms further include, in addition to said normal vectors, vectors which define a direction of said interpolated lines at said vertices.

59. (Original) The program distribution medium as described in claim 49, wherein said interpolation vectors at the vertices of said unit graphic forms are interpolated line direction vectors which define a direction of said interpolated lines at said vertices.

60. (Canceled)

61. (Original) The program distribution medium as described in claim 59, wherein said interpolated line direction vectors are vectors which define a tangent direction of said interpolated lines at said vertices.

62. (Original) The program distribution medium as described in claim 49, wherein said computer program further includes an interpolation vector computation step that determines, from interpolation vectors at said vertices, the interpolation vector to be used for

determining the line that interpolates the space between a given interpolated point and another interpolated point in said interpolated points.

63. (Original) The program distribution medium as described in claim 62, wherein

when a ratio of the values corresponding to a distance from said interpolated point between one vertex and another vertex to said one vertex or to the other vertex, respectively, is denoted by t: 1-t,

said interpolation vector computation step determines as the interpolation vector at said interpolated point the result corresponding to the sum of (1-t) times the interpolation vector at said one vertex plus t times the interpolation vector at said other vertex.

64. (Original) The program distribution medium as described in claim 63, wherein

said computer program further includes a correction step that corrects the interpolation vector at said interpolated point determined by said interpolation vector computation step.

65. (Original) The program distribution medium as described in claim 64, wherein

said correction step

determines a vector product of the interpolation vector at said interpolated point determined by said interpolation vector computation step and a tangent-direction tangent vector of said interpolated line at said interpolated point,

determines the vector product of said vector product and said tangent vector, and takes the resulting vector as a post-correction interpolation vector at said interpolated point.

66. (Original) The program distribution medium as described in claim 65, wherein

said image is a three-dimensional image, and

said program further includes a rendering step that renders said sub-unit graphic forms.

67. (Original) The program distribution medium as described in claim 66, wherein said rendering step performs shading based on said post-correction interpolation vector.

68. (Original) The program distribution medium as described in claim 49, wherein said interpolated line is a Bezier curve.

69. (Canceled)

70. (Original) The program distribution medium as described in claim 49, wherein

if the coordinates of the vertices of said unit graphic forms and the interpolation vectors are recorded on a recording medium,

said computer program further includes a playback step which plays back from the recording medium the coordinates of said vertices and the interpolation vectors.

71. (Original) The program distribution medium as described in claim 49, wherein

if the coordinates of the vertices of said unit graphic forms and the interpolation vectors are transmitted via a transmission route,

said computer program further includes a reception step that receives the coordinates of said vertices and the interpolation vectors transmitted via the transmission route.

72. (Original) The program distribution medium as described in claim 49, wherein

said image is a three-dimensional image,

said computer has an operation means which is operated when a prescribed input is given, and

said computer program further includes:

a geometry processing step that reads data concerning said unit graphic forms from a recording medium and with respect to the data performs geometry processing that corresponds to an input from said operation means,

a conversion step that converts said sub-unit graphic forms obtained by splitting said unit graphic forms resulting after said geometry processing into ones in the coordinate system of a two-dimensional output device, and

a rendering step that renders said sub-unit graphic forms converted by said conversion step.

73. (Original) The program distribution medium as described in claim 49, which

also provides the coordinates of the vertices of said unit graphic forms and the interpolation vectors.

74. – 133. (Canceled)